



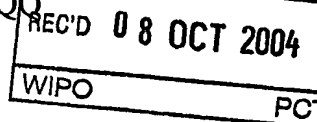
US04/21499



INVESTOR IN PEOPLE

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The Patent Office
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NP10 8QQ



I, the undersigned, being an officer duly authorised in accordance with Section 74(1) and (4) of the Deregulation & Contracting Out Act 1994, to sign and issue certificates on behalf of the Comptroller-General, hereby certify that annexed hereto is a true copy of the documents as originally filed in connection with the patent application identified therein.

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Signed

Andrew Gersey

Dated 22 July 2004

**PRIORITY
DOCUMENT**

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THE PATENT OFFICE

M

29 MAY 2004

NEWPORT

01JUN04 E900074-1 825508

P01/7790 0.00-0412114.1 NONE

Your reference

206B

29 MAY 2004

0412114.1

Notes

Please type, or write in dark ink using CAPITAL letters. A prescribed fee is payable for a request for grant of a patent. For details, please contact the Patent Office (telephone 071-438 4700).

Rule 16 of the Patents Rules 1990 is the main rule governing the completion and filing of this form.

② Do not give trading styles, for example, 'Trading as XYZ company', nationality or former names, for example, 'formerly (known as) ABC Ltd' as these are not required.

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The
**Patent
Office**

**Request for grant of a
Patent**

Form 1/77

Patents Act 1977

1 Title of invention

1 Please give the title of the invention

APPARATUS AND
METHOD FOR HEATING
FLUIDS

2 Applicant's details

☐ First or only applicant

2a If you are applying as a corporate body please give:

Corporate name

Country (and State
of incorporation, if
appropriate)

2b If you are applying as an individual or one of a partnership please give in full:

Surname

THOMA

Forenames

CHRISTIAN HERMUT

2c In all cases, please give the following details:

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CHALET ABACO
GREEN ROAD
ST. CLEMENT
JERSEY

UK postcode
(if applicable)

JE 2 6QA

Country

ADP number
(if known)

123984001

2d, 2e and 2f: If there are further
nts please provide details on a
separate sheet of paper.

☐ **Second applicant (if any)**

2d If you are applying as a corporate body please give:
Corporate name

Country (and State
of incorporation, if
appropriate)

2e If you are applying as an individual or one of a partnership please give in full:

Surname

Forenames

2f In all cases, please give the following details:

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UK postcode
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ADP number
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③ An address for service in the
United Kingdom must be supplied

Please mark correct box

③ **Address for service details**

3a Have you appointed an agent to deal with your application?

Yes ☐ No ☒ go to 3b

↓
please give details below

Agent's name

Agent's address

Postcode

Agent's ADP
number

3b: If you have appointed an agent, all
correspondence concerning your
application will be sent to the agent's
United Kingdom address.

3b If you have not appointed an agent please give a name and address in the
United Kingdom to which all correspondence will be sent:

Name c/o STEFF THOMA

Address Hawthorns
Sandpit Lane
Penn Bucks

Postcode HP108HD

Daytime telephone
number (if available)

ADP number
(if known)

01534
- 878241

8466406001

206B

Country of filing	Priority application number (if known)	Filing date (day, month, year)
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Country of filing	Priority application number (if known)	Filing date (day, month, year)

7 The answer must be 'No' if:

any applicant is not an inventor
or is an inventor who is not an
applicant, or

any applicant is a corporate body.

8 Please supply duplicates of
claim(s), abstract, description and
drawing(s).

Please mark correct box(es)

9 You or your appointed agent (see
Rule 90 of the Patents Rules 1990)
must sign this request.

Please sign here ➡

A completed fee sheet should
preferably accompany the fee.

7 Inventorship

7 Are you (the applicant or applicants) the sole inventor or the joint inventors?

Please mark correct box

Yes ☒

No ☐

➡ A Statement of Inventorship on Patents
Form 7/77 will need to be filed (see Rule 15).

8 Checklist

8a Please fill in the number of sheets for each of the following types of
document contained in this application.

Continuation sheets for this Patents Form 1/77

Claim(s)

Description

✓

Abstract

Drawing(s)

✓

8b Which of the following documents also accompanies the application?

Priority documents (please state how many)

Translation(s) of Priority documents (please state how many)

Patents Form 7/77 – Statement of Inventorship and Right to Grant
(please state how many)

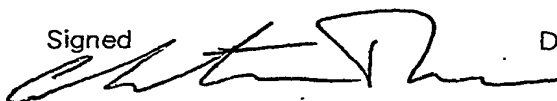
Patents Form 9/77 – Preliminary Examination/Search

Patents Form 10/77 – Request for Substantive Examination

9 Request

I/We request the grant of a patent on the basis of this application.

Signed



Date

27 MAY 2004
(day month year)

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APPARATUS AND METHOD FOR HEATING FLUIDS

Certain improvements have been discovered which are here described and follow on the Apparatus and Method for Heating Fluids filed on July 4th, 2003 as Patent Application GB 0315576.9.

Figure 24 is a longitudinal sectional view of the heat generating device of Fig. 1. according to a fifth embodiment of the present invention, deploying a one-piece rotor and shaft component with axial feed port and internal intake passages.

Figure 25 is a longitudinal sectional view of the heat generating device of Fig. 24 with the modification in respect of the rotating unit of having a fluid throttle orifice disposed at the entrance to the fluid intake passageway.

Figure 26 is a longitudinal sectional view of the heat generating device of Fig. 24 with the modification in respect of the rotating unit of having one or more angled passageways in the interior of the rotating unit.

Figure 27 is a longitudinal sectional view of the heat generating device of Fig. 26 with the modification in respect of the rotating unit of having one or more fluid throttle orifices disposed in the interior of the rotating unit and communicating with one or more holes in the first row of holes

Figure 28 is a longitudinal sectional view of the heat generating device of Fig. 1. according to a sixth embodiment of the present invention, deploying a two-piece rotor and shaft component, where an axial feed port opening to a longitudinal passageway is arranged to be connected with more than one row of holes opening on the periphery of the rotor, via directly or via a fluid throttle orifice.

Detailed Description of the Fifth Illustrative Embodiment of the Invention

As this embodiment of the present invention, depicted in Fig. 24, has a rotating component 200 having an entrance port 201 leading to internal longitudinal passageway 202. Passageway 202 connects with one or more radial passageways 205 which direct the fluid, entering at intake 10iv to the exterior peripheral surface 206 that lies radially inwards of bore 207. Once fluid entering this annular clearance at the point where the radial passageways 205 open 210 on peripheral surface 206, the fluid travels across a series of rows of holes denoted by reference numerals 211, 212, 213 before exiting the device in a heated condition at threaded exit connection 214. The relatively cold fluid entering at axial port 201 picks up heat from the rotating component 200 during its transit to opening 210 on peripheral surface 206, thereby pre-heating the fluid.

As compared to Fig. 24, Fig. 25 incorporates a fluid throttle 218 at the inner end 219 of rotating unit 220, the throttle has a relatively small central hole which acts as an orifice to slow down the flow rate of fluid from inlet 10iv to the longitudinal passageway 222.

As compared to Fig. 24, Fig. 26 has at least one inclined passageway 230 connecting with longitudinal passageway 237 on the one hand, and opening at 231 in the volume space between wall 235 of housing 2 and face 236 of the rotating component 234. The relatively cold fluid entering the device at inlet 10iv near axial port 238 flows through the passageways 237, 230 before being redirected at opening 231 to flow radially outwardly in the volume space between wall 235 and face 236 to reach annular clearance where a number of holes 240 are positioned along the exterior surface of the rotating unit 234. The heated fluid exits the device at threaded exit connection 214.

As compared to Fig. 24, Fig. 27 shows a pair of fluid throttle 250, 251 disposed in the rotating unit 252. The rotating component 252 has an entrance port 253 leading to internal longitudinal passageway 254. Passageway 254 connects with radial passageways 255, 256 to communicate via respective throttles 250, 251 with holes 260, 261 of the first array of holes in the rotating unit.

Detailed Description of the Sixth Illustrative Embodiment of the Invention

In this embodiment of the present invention, depicted in Fig. 28, the rotating component comprises a rotor sleeve portion 270 fixed to a drive shaft portion 271, preferably by a heat-shrink fit.

The exterior of the rotor sleeve 270 is shown having a conical male exterior surface 272 and surrounding sleeve housing member 275 is provided with a complimentary opposing female conical surface 176.

However, it should be noted that either or both rotor sleeve 270 and sleeve housing member 275 may be cylindrical.

As shown, there are four rows comprising a series of openings or depression zones, here in the form of drilled holes such as holes denoted by reference numerals 280, 281, 282, 283. By way of example, all such holes 280-283 shown lying about rotational axis 290 are connected by respective smaller holes 290, 291, 292, 293 to longitudinal passageway 295. By way of further example, the holes shown lying below the rotational axis are connected to longitudinal passageway via a respective throttle, shown for example as throttle 296.

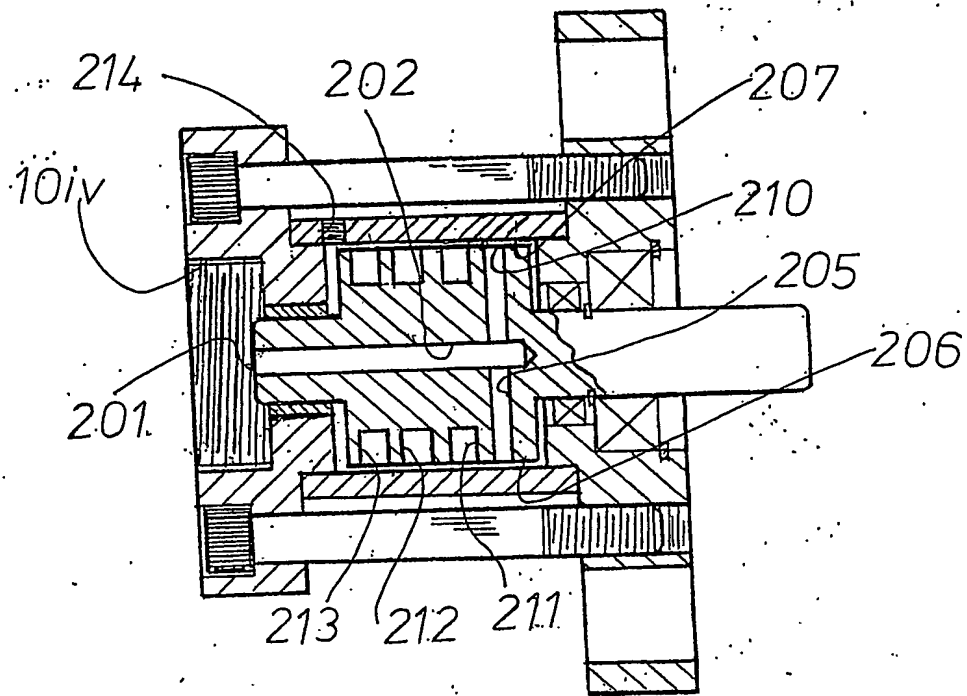


FIG. 24

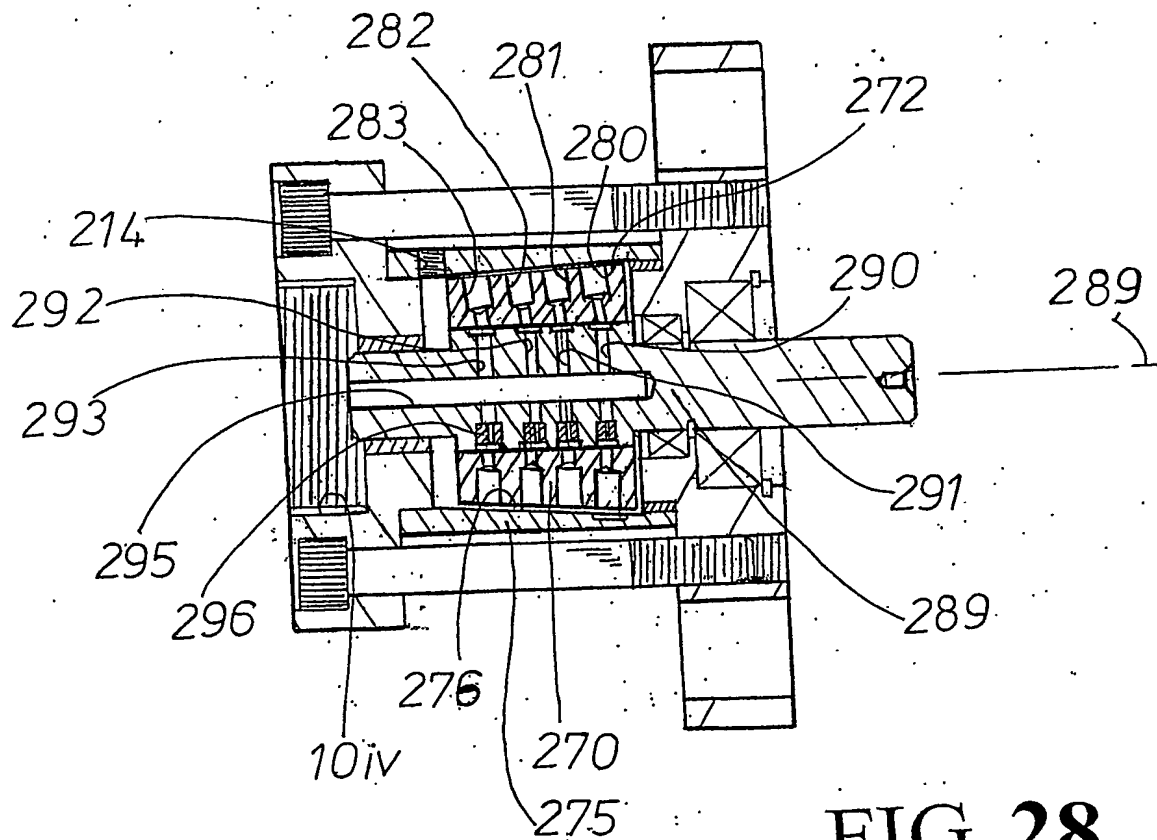


FIG. 28

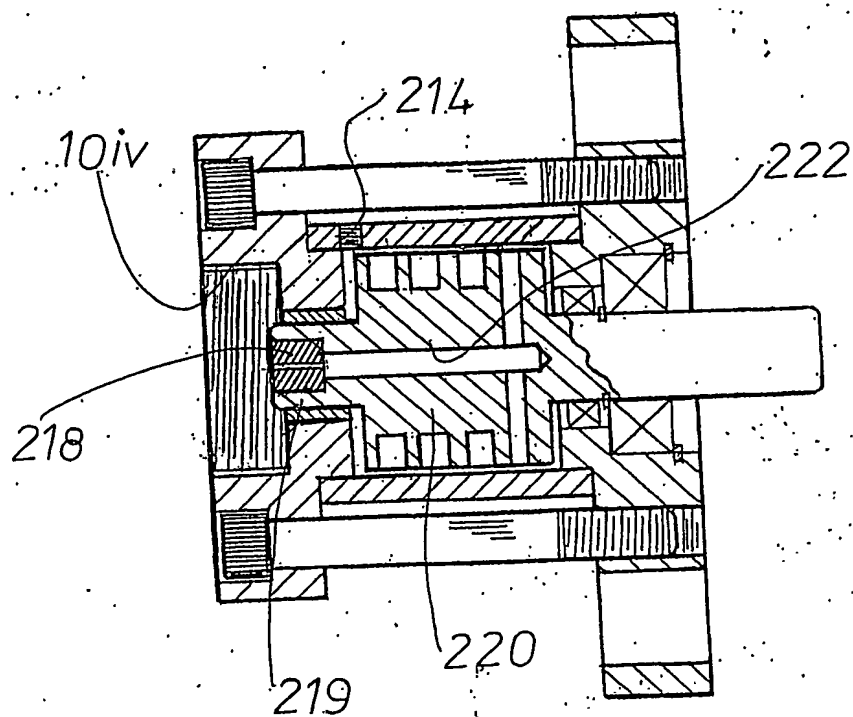


FIG. 25

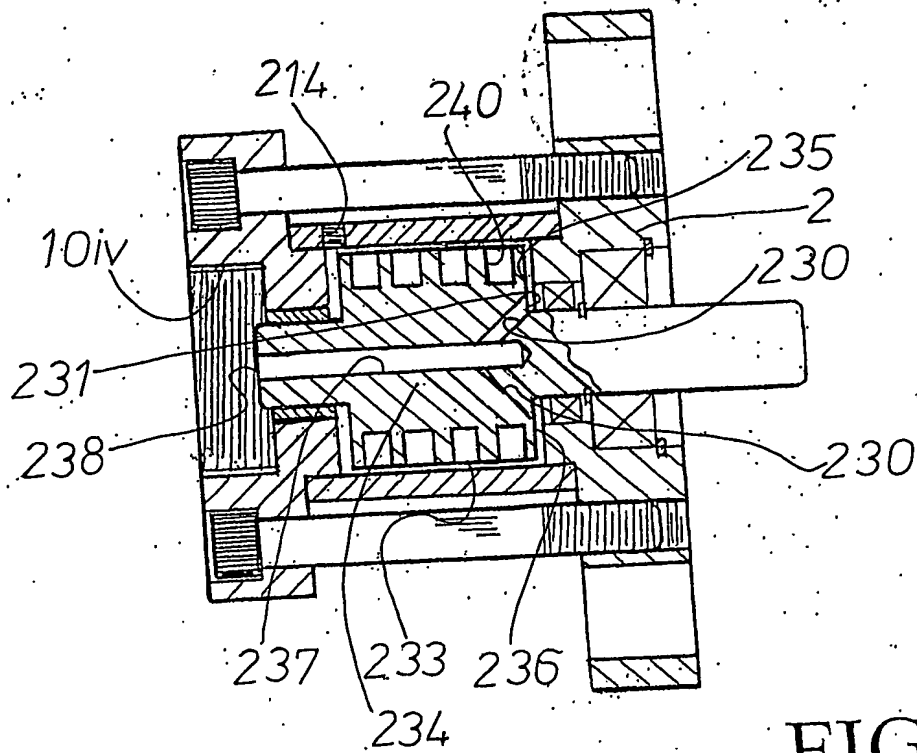


FIG. 26

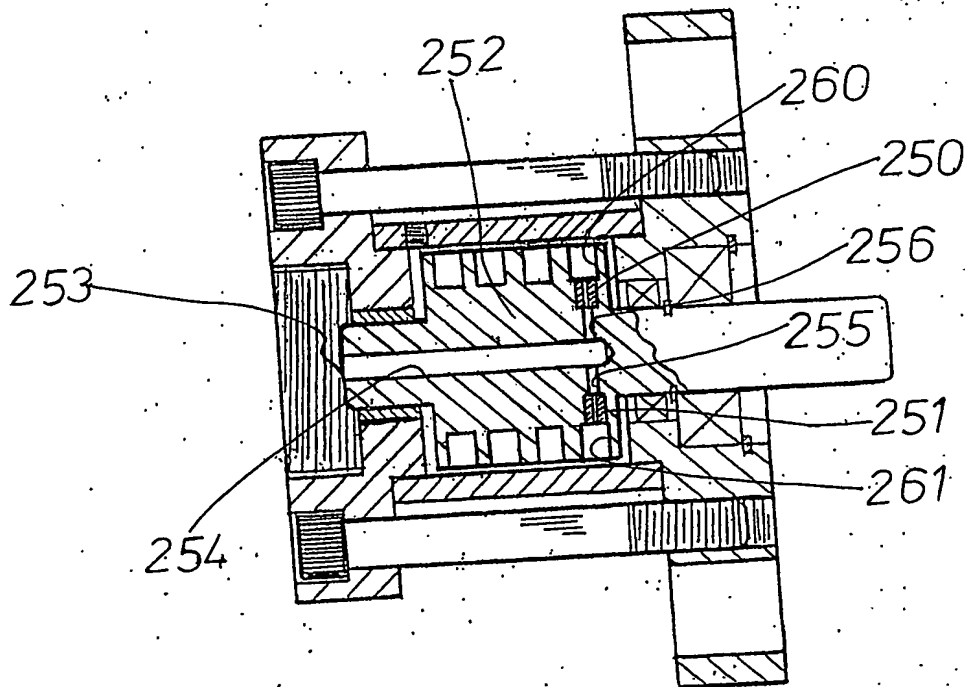


FIG. 27